

The Analysis of the Sustainable Development to Protect Indonesian Watersheds from the Issue of Plastic Waste

Trias Hernanda^{1*}, Absori², Aidul Fitriadi³ and Kelik Wardiono⁴

¹*Universitas Muhammadiyah Kudus, Jl. Ganesha Raya No. 1, Purwosari, Kec. Kota Kudus, Kudus Regency, Central Java, 59316, Indonesia.*

^{2,3,4}*Universitas Muhammadiyah Surakarta, Jl. Ahmad Yani, Mendungan, Pabelan, Kec. Kartasura, Sukoharjo Regency, Central Java 57169, Indonesia*

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ABSTRACT

In Indonesia, the concept of sustainable development has long been applied, but unfortunately, not all targets have been achieved. One of the less successful programs is environmental protection for impacted watersheds. In Indonesia, watersheds are polluted by plastic waste, which contaminates the watersheds' ecological area and river water with microplastic. This research focuses on Indonesian watersheds that are currently experiencing pollution from plastic waste. The data of this research were obtained firstly from the observation results of large watersheds in Indonesia. Secondly, the data were obtained from journal articles concerning watersheds. It would be very beneficial if the sustainable development concept is applied correctly by the Indonesian government. This situation will also benefit watershed protection in Indonesia. The principle of the legal state applied by Indonesia provides flexibility for the government to enforce regulations on environmental law violations as well as the illegal disposal of plastic waste in rivers. The sustainable development concept is already integrated in Law No. 32 of 2009 on Environmental Protection and Management, but there is a lack of socialization and innovation in modern waste management in all Indonesian areas. This condition leads to the suboptimum application of the sustainable development concept. There needs to be innovation and strategies to carry out legal actions against people who violate the laws to save the Indonesian watersheds from plastic waste. Apart from enforcing the law, an alternative method is by motivating people to increase their awareness of environmental protection and providing training on how to manage waste well. It can also be carried out by giving feedback on watershed preservation and its advantages for the society. Apart from that, the Indonesian government may take the middle way by utilizing local wisdom-based eco-friendly products and encouraging sustainable waste management between Indonesian people's dependency on plastic packaging.

Keywords: Sustainable Development, Watershed, Plastic waste, Indonesia

Introduction

In Indonesia, the concept of sustainable development has long been applied, but unfortunately, not all targets have been achieved. One of the less suc-

cessful programs is environmental protection for impacted watersheds. In Indonesia, watersheds are polluted by plastic waste, which contaminates the watersheds' ecological area and river water with microplastic. The Indonesian government should

make efforts to find the right solutions, for example by creating innovations and strengthening environmentally friendly products. This can be manifested through creating local wisdom-based products from bamboo and teak leaves, as well as applying the sustainable waste management concept that orients towards recycling plastic waste into marketable goods.



Fig. 1. The Sources of Waste in Indonesia

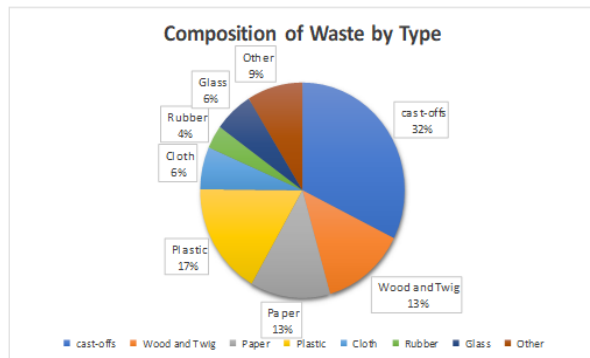


Fig. 2. The Composition of Waste by type in Indonesia

The diagrams above show that plastic waste is ranked as the second source of waste issue faced by Indonesia. Watershed protection and management need to continually be applied in Indonesia. A cause of watershed pollution is plastic waste. There is a culture in society that refrain them from stopping plastic use. Then, the affordable price of plastic caused it to become the most idolized packaging material. At the global level, it is estimated that 360,000 kg of plastic are produced annually (Plastics Europe, 2019). An analysis estimated that the largest waste disposal line is the river flow, which then flows to the ocean, which is estimated to be 1,150 and 2,410 kg/yr (Lebreton *et al.*, 2019). The plastic's undecomposable characteristic and the inefficient plastic waste management in some countries prove

how difficult it is to decrease the dependency on plastic to protect the environment (Helinski *et al.*, 2021).

According to Lebreton, Indonesia's largest rivers are categorized as the most polluted and are ranked the fourth in the world (Lebreton and Andrady, 2019). The plastic waste that flows and sinks in some of the Indonesian large rivers becomes the source of problems to the environment and biodiversity. One of the issues caused by plastic in rivers is microplastic (Falahudin *et al.*, 2019) (Retno *et al.*, 2021). From the results of these studies, the action to care for Indonesian rivers is questioned. The Indonesian government actually has come out with regulations that can be used to protect the watersheds from plastic pollution and Indonesia is part of the United Nations' sustainable development program.

To protect watersheds, the government has issued some legal stipulations that adopt the sustainable development principle. But these regulations are often ignored and not on target. For instance, there is a minimum understanding of sustainable development in Indonesia and the Indonesian government's policies tend to support foreign investments. These are part of the threats that should be questioned. Seeing from the available facts, according to Hernanda, the Indonesian government often await disasters before coming up with the anticipation (Hernanda and Giyono, 2021).

Indonesia is blessed with mega biodiversity that deserves protection. Balancing the sustainable development pattern is key to the future of the Indonesian watersheds. The Indonesian government must also continually strive for the protection of river basins, as it is part of protecting this country's future. The existing laws on watershed protection must be enforced well and evaluations need to be conducted if there are weaknesses. This paper aims to encourage regulatory innovation and evaluation to protect Indonesian watersheds to optimize the sustainable development adopted by the Indonesian government.

Method

This research focuses on Indonesian watersheds that are currently experiencing pollution from plastic waste. The data of this research were obtained firstly from the observation results of large watersheds in Indonesia. Secondly, the data were obtained from journal articles concerning watersheds. Thirdly, the data were obtained from observing local wisdom

products that were made from plastic waste obtained from watersheds. After that, the data were collected to be analyzed. The researcher also found solutions to the analyzed issues.

Results and Discussion

The Condition of the Indonesian Sustainable Development Goals (SDGs)

Sustainable development is a great agenda that is continually evaluated by the United Nations in the last few decades. Previously, there were the millennium development goals that had the same agenda as the sustainable development goals, but with only eight goals, meanwhile, the SDGs have seventeen goals. SDGs' seventeen goals are: eradicating poverty, decreasing famine, creating decent and prosperous lives, better education, gender equality, clean water and good sanitation, clean energy, sustainable industry, equality among countries, climate change, good sea ecosystem quality, peace and justice (Gigliotti, 2018).

Indonesia is currently ranked 82nd on the sustainable development index released by the United Nations. Then, at the Southeast Asian level, Indonesia is still ranked under Thailand, Vietnam, Singapore, and Malaysia (United Nations, 2022). In the case of SDG optimization, Indonesia has established an institution that concentrates on supervising this program, namely the National Development Planning Agency (*Badan Perencanaan Pembangunan Nasional / Bappenas*). Some Indonesian laws have adopted the elements of sustainable development, including Law No. 32 of 2009 on Environmental Protection and Management; Law No. 17 of 2019 on Water Resources; and Law No. 23 of 2014 on Regional Government.

As an institution that is responsible for sustainable development in Indonesia, Bappenas has an agenda to successfully reach the SDGs, by creating national- and regional-level programs. At the national level, there are the SDG Action Plans and at the regional level, there are the SDG Regional Action Plans. Indonesia's commitment to achieving the SDGs is rather quite serious. From 2015 to 2019, the Indonesian government inserted the 2030 sustainable development agenda into the Mid-Term Development Plans as stipulated in the Presidential Decree No. 59 of 2017. Apart from that, Indonesia has become the host of the 2022 G20.

There are great challenges to applying the SDGs in Indonesia, for instance, there was the issuing of Law No. 11 of 2020 on Job Creation that adopted the Omnibus Law system. This law aimed to accelerate foreign investment in Indonesia. The early draft of this law created an uproar in Indonesia. Many environmental protection interests were ignored, such as the plan for deleting the Environmental Impact Assessments (Sudarwanto and Kharisma, 2020). Although in the end, the Environmental Impact Assessments were not eradicated, some of its original functions were decreased. For instance, previously, every member of the community had the right to protest or sue perpetrators when impacted by development in any way. But not this right is only given to those who are directly impacted by the development.

Sustainable development in Indonesia actually has good bargaining power, but not many people have understood this concept (Gunawan *et al.*, 2019). Thus, the sustainable development concept in Indonesia has not optimally been applied and there needs to be coordination between institutions and ministries to increase the target achievement (Santika *et al.*, 2020). Apart from that, to support governmental programs on sustainable development, the government needs to be more committed and society needs to be more aware.

The Plastic Waste Management in Indonesia

Indonesia has some regulations that can be used to manage waste and limit inconsequential waste disposal. At the national level, the regulations are Law No. 18 of 2008 on Waste Management, Law No. 32 of 2009 on Environmental Protection and Management, and the Governmental Decree No. 27 of 2020 on Specific Waste Management. Then, at the regional level, each region has applied their own laws, for instance, the Regional Regulation No. 4 of 2019 on Waste Management and the Regulation of the Governor of Bali No. 47 of 2018 on Limiting One-Time-Use Plastic Waste.

The development of the Indonesian government's policy on plastic waste is by creating advanced regulations in each area on limiting plastic use in shops, minimarkets, and supermarkets. Further, the government also encouraged businesses to use packaging from natural or recyclable materials such as leaves, plant-based materials, and paper. Various organizations for environmental causes also support the government's policies to decrease plastic waste

in Indonesia, for instance, the movements of some non-governmental organizations such as Ecoton, Greenpeace (Lipej *et al.*, 2022), and the Zero Waste Alliance that campaigned the dangers of plastic waste to Indonesian rivers. Some of their activities are shown in the figure below.



Fig. 3. An NGO shows how sachets from multinational corporations pollute Indonesian rivers

Indonesia's 1945 Constitution Article 28 clause 1 has guaranteed its citizens the right to a good life, the right to choose their own religion, to obtain independence, to obtain justice in the face of the court, and to live in a clean and healthy environment (Absori *et al.*, 2020). Then, Article 33 of the 1945 Constitution explained that environmental management is guaranteed by the state for people's welfare. The government has carried out efforts to decrease plastic waste and to clean the environment of watersheds since a long time ago. This is proven by Indonesia's commitment to becoming part of the UN and it has ratified all of the UN's regulations on environmental protection.

Indonesia is a legal state that guarantees justice and welfare for its citizens (Dimiyati *et al.*, 2021). But when considering the depleting biodiversity and pollution of watersheds due to plastic waste, it is shown that the Indonesian government has great challenges to optimize the regulations and enforcing legal policies on decreasing plastic waste. The issue of environmental destruction is not very sexy in Indonesia, as it tends to focus on justice and there is

limited room for environmental sustainability (Sloan *et al.*, 2018). Thus, the environmental and watershed protection policies made so far are still suboptimum.

Plastic Waste's Threat to the Future of Indonesian Watersheds

ature is the source of life for humans and other creatures (Fedele *et al.*, 2021). Many countries have good natural resources, including Indonesia, but such blessings come with the great responsibility to manage and preserve them. Conflicts between humans and the environment keep on happening in Indonesia. The environmental condition in Indonesia is annually unstable (Pirmana *et al.*, 2021). One of the factors that influence the depleting environmental quality is the river pollution in Indonesia caused by plastic waste.

Watersheds all over Indonesia are disturbed by floating or sunk plastic waste. This is caused by the perception of some Indonesians that plastic can easily be decomposed by nature and that the river is a flowing waste disposal facility. In consequence, some large Indonesian rivers are contaminated by plastic and microplastic (Lestari *et al.*, 2020) (Lebreton *et al.*, 2017). During the Covid-19 pandemic in 2021, Indonesia is one of the most impacted countries in Southeast Asia. At that time, the threat of plastic waste increased (Shamsa and Alam, 2021). This is a factor that increased the threats to watershed environments in Indonesia.

The Indonesian government should not underestimate the issue of plastic pollution in rivers. There needs to be early anticipation and routine socialization to handle it. Indonesia has strict regulations but its environmental law is weak, for instance, there are rampant cases of deforestation (Tacconi *et al.*, 2019), illegal logging (Kambey *et al.*, 2001), and polluted rivers (Suriadikusumah *et al.*, 2021).

Indonesian watersheds have a role in maintaining the balance in life. Indonesia has committed to undergoing development that orients to environmental protection including protecting watersheds by ratifying the sustainable development concept. Cutting the dependency on plastic is a way to preserve watersheds, as plastics cannot naturally be degraded (Phuong *et al.*, 2016). The figures below show the piling of plastic waste at the Bengawan Solo river watershed in Central Java Province.

The images above show that plastic waste such as plastic packaging of fast food and snacks, plastic sachets, and plastic bags pollute the river area. Ac-



Fig. 4. Plastic waste pollutes the river



Fig. 5. Plastic packaging pile up on the Bengawan Solo river bank

According to Boyle, such types of plastics are difficult to be degraded by the environment (Boyle and Örmeci, 2020). River protection and safety provide certainty about the river quality. Apart from that, protecting rivers means protecting the future of humans.

Sustainable Strategies to Save Watersheds from Plastic Waste

The sustainable development concept is a great concept that orients towards justice for humans and the environment. If the seventeen goals determined by sustainable development are maximally applied, it will impact the future of the earth and all that it contains, including watersheds. This is because one of the SDGs' concepts is clean water and good sanitation. But there needs to be strategic support to apply the SDGs that orient toward saving Indonesian watersheds to provide clean water and proper sanitation, such as:

Strengthening local wisdom-based products

Indonesia is one of the countries which has diverse cultures and ethnic groups (Wahyudi *et al.*, 2017). According to the National Statistic Agency, Indonesia has 1340 ethnic groups that are dispersed in all of the Indonesian islands that still maintain local wisdom cultures. According to the Indonesian constitution, local wisdom is part of the customary law that has a special place in the legal protection framework. An example is Law No. 32 of 2009 on Envi-

ronmental Protection and Management Article 1 clause 30 which states, "Local wisdom is noble values that apply in society's life order whose function includes to sustainably protect and manage the environment."

The existence of the local wisdom in Indonesia can be witnessed in the products that most Indonesians still use. Most local wisdom products in Indonesia are eco-friendly and plastic-free. Unfortunately, there is a decreasing interest in using those products. Also, the Indonesian government's commitment to encouraging the use of environmentally friendly local products lacks socialization. Worse, the legal protection for the use of environmentally friendly local wisdom products is non-existent in the Indonesian legislation. Below are some examples of environmentally friendly local wisdom products that are often used by Indonesians in their daily lives.

Indonesia is actually rich in eco-friendly cultures and inherited products, but due to the shift in the



Fig. 6. Environmentally friendly rubbish bins used in housing complexes.



Fig. 7. Teak leaves for packaging food



Fig. 8. Teak leaves for packaging fermented soybean cake or *tempeh* (a very popular type of food in Indonesia)

era and the times, these products are left behind. Apart from that, the existing condition forces society to leave behind environmentally friendly products that were inherited from their cultural identities (Widodo, 2012)

The environmentally friendly products in Indonesia actually have a great role in maintaining the sustainability of watersheds. The Indonesian government's efforts that only focus on decreasing the use of plastic in daily life are not enough. The Indonesian government should reconsider using local wisdom-based eco-friendly products. Apart from saving watersheds from the threat of plastic waste, the use of such products will preserve the state's cultural identity.

Encouraging Waste Management in Various Areas in Indonesia

Waste has become an annual issue in Indonesia (Hernanda *et al.*, 2020), including plastic waste. This causes socio-economic impacts on the environment (Haward, 2018). The affordable price of plastic causes people's high dependence on it, as it is a solution for multiuse packaging (Ren *et al.*, 2021). In all of Indonesia, regulations on waste management have been issued in the constitutional regulations and every area is obliged to have regulations on waste management. Thus, plastic waste littering can be imposed sanctions. This must optimally be applied. But other issues may also arise, namely there is an overcapacity of landfills in every area. This

causes people to litter, one of which by littering rivers, impacting the Indonesian seas to be contaminated by plastic that becomes the final disposal (Purba *et al.*, 2019).

The overcapacity of the landfills causes problems as it is constrained with waste management or recycling. Some Indonesian areas have actually adopted decomposition-based waste management. It is carried out by turning plastic waste into marketable usable items as shown below:



Fig. 9. How recycled plastics can create empowerment



Fig. 10. Shopping bags created from recycled plastics.

The image above shows the process of recycling plastic into shopping bags carried out by Syam Indonesian Handicraft creative industry in Pati Regency, Central Java. Unfortunately, not all Indonesian areas have applied recycling-based waste management as in the example above, as there is often a lack of awareness of environmental and watershed protection.

The Indonesian government should encourage every area to integratively and sustainably manage plastic waste. This is carried out by applying binding regulations and determining annual targets for decreasing plastic waste. Coercing regulations is the

last resort if people still lack awareness of complying with regulations. If sustainable waste management succeeds, it will not only affect the cleanliness of river environments but will also open up new job opportunities for Indonesians.

Conclusion

It would be very beneficial if the sustainable development concept is applied correctly by the Indonesian government. This situation will also benefit watershed protection in Indonesia. The principle of the legal state applied by Indonesia provides flexibility for the government to enforce regulations on environmental law violations as well as the illegal disposal of plastic waste in rivers. The sustainable development concept is already integrated in Law No. 32 of 2009 on Environmental Protection and Management, but there is a lack of socialization and innovation in modern waste management in all Indonesian areas. This condition leads to the suboptimum application of the sustainable development concept.

There needs to be innovation and strategies to carry out legal actions against people who violate the laws to save the Indonesian watersheds from plastic waste. Apart from enforcing the law, an alternative method is by motivating people to increase their awareness of environmental protection and providing training on how to manage waste well. It can also be carried out by giving feedback on watershed preservation and its advantages for society. Apart from that, the Indonesian government may take the middle way by utilizing local wisdom-based eco-friendly products and encouraging sustainable waste management between Indonesian people's dependency on plastic packaging.

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Conflict of interest

The authors would like to declare that there is no conflict of interest.

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